

BOUFFLEUR (A. I.)

A CASE OF FRACTURE OF, AND DISLOCA- TION BETWEEN, THE TENTH AND ELEVENTH DORSAL VERTEBRÆ, WITH PRESENTATION OF THE PATIENT.

BY

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It was my intention to present this case, and two others, with a paper which I have under preparation on the general subject of Spinal Injuries, but I have not had time to prepare an exhaustive paper on the subject, and as the patient is very anxious to visit his brother in New York, I will leave that to a future time and present to-night only a brief report of the history and treatment of this case, and the patient himself to show the results.

J. K., aged thirty-one years, teamster, German. About 10 A. M. on the 11th of March, 1891, he was riding on a load of brick, and while driving under a low shed was struck just below the nape of the neck, while his body was in an extremely stooped position. As the wagon proceeded the ends of his vertebral column were brought nearer to each other than the anatomical continuity would permit, and consequently he sustained a fracture and dislocation of the vertebræ which will be described below. I saw the case about five hours after the accident and obtained this history of the injury. At the time of the accident he felt "something break," and after the wagon had cleared the shed he was lying flat on his back on top of the load. He tried to get up, but found that he could not elevate his trunk or move his legs at all. In answer to his cries friends came to his assistance and lifted him from the wagon and tried to stand him up, but his legs would not support him; then they tried to set him up in a chair, but the slightest relaxation of their support caused him "terrible pain," as he put it. When I saw him he was complaining of severe pain in the middle of his back and over the front of thorax and abdomen, and also of a sensation as though a strap was fastened around him about the umbilicus.



Examination: An immense swelling over the whole dorsal region was noted, also a marked deformity of the back. It was found that there was a marked prominence about the eleventh vertebræ and an equally marked depression just above it. The immense diffuse swelling was soft and semi-fluctuating, being caused by extensive extravasation of blood throughout the subcutaneous tissues. Palpation at the point of injury caused severe pain. The blood-clot beneath the skin was so extensive and thick that we were unable to determine positively the presence of crepitus, though at times we thought we could detect it. Upon further examination, I found that there was complete motor paralysis below the umbilicus, including paralysis of the bladder and rectum, with hyperæsthesia of the corresponding surface,—paraplegia dolorosa.

There was no reason to doubt that we had compression of the cord, and that the compression was caused by direct counter-pressure of the two vertebræ. That the cord was not pulped nor completely severed was shown by the hyperæsthesia which indicated an irritation of the sensory nerves and not a complete interruption of the cerebro-peripheral continuity.

Being uncertain as to the presence or absence of a fracture of any of those parts of the vertebræ which enter into the formation of the spinal foramen, and remembering that a dislocation of one vertebra upon another is quite invariably accompanied by fracture, more or less extensive (of the rims at least), of the bodies of the vertebræ, I tried reduction by extension and counter-extension very cautiously. The teachings of Brown-Sequard, "that the ascending inflammatory lesions of the cord, which follow injury to the spine, are caused by the irritation of fragments of fractured bone," caused me to think it inadvisable to try forcible reduction by great extension, rotation, etc., and as there was a probability of an accompanying hemorrhage about the cord an operation seemed, to me, the only rational and scientific procedure. There had been no improvement whatever in the five hours following the accident. The patient readily consented to an operation, which I performed about seven hours after the accident, with the valuable assistance of Drs. Bush, Piper, Gehrmann and Keyes.

At this age it is needless to say that the field of operation and everything which could in any way come in contact with the

wound was rendered aseptic. Chloroform was administered with the patient in a semi-prone position. An incision five inches long

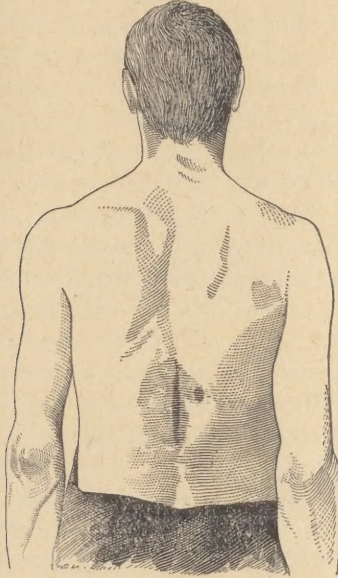


FIG. 1.—Showing line of incision and point of drainage.

was made in the median line. After cutting through the superficial fascia, which was distended to the thickness of about one and one-half inches by extravasated blood, we found that the muscles of that region, the vertebral aponeurosis, and all the intervertebral ligaments had been ruptured transversely, in fact broken. The tenth vertebra was found dislocated forwards upon the eleventh, the laminae of the tenth resting on the body of the eleventh, with the flattened cord between. I could not detect any fracture of the spinal arches, but found fractures of the articular processes, fragments of which were removed. The introduction of the finger down to the cord determined the fact, that the spinal canal was filled with a firm extra dural blood-clot which was easily broken down by the finger. Considerable hemorrhage followed the withdrawal of the finger. Irrigation with quite warm sterilized water served the double purpose of washing out the clots and stopping the hemorrhage.

The anterior and posterior longitudinal spinal veins, the former of which are, normally, nearly the size of a lead-pencil, had been severed. The interval between the transverse processes of the two vertebræ easily admitted the finger, which detected a large blood-clot anterior to the bodies of the vertebræ in the posterior mediastinal space. It was removed by irrigation. All hemorrhage having been controlled, reduction was effected by following the rule which the late Professor Gunn offered concerning reduction of dislocations of the hip, and which is quite as applicable in all dislocations as in those of the enarthrodial joints, viz: "First, place the parts, as near as possible, in the position in which they were at the time of escape; and, second, reverse the force." I followed this as much as possible by first flexing the trunk, and second, by making extension and counter-extension from the shoulders and legs, and local elevation of the upper segment with depression of the lower. The vertebræ were thus brought into position, but the articular processes would not approximate properly, and on slight motion of the body would slip by each other. To maintain the parts in proper position, I connected the two spinous processes by means of a very large silk ligature, inserted through drill perforations of the upper part of the tenth and the lower part of the eleventh spinous processes near the laminæ. By this means we were enabled to completely reduce *and maintain* the segments in proper coaptation.

Owing to a natural tendency to ooze, it was deemed advisable to use tubular drainage, so as to prevent the possibility of pressure by the reformation of a blood-clot near the cord. Accordingly a small rubber tube was placed anterior to the vertebræ and out through the wound, while a large short tube was inserted down to the laminæ, between the tenth and eleventh vertebræ, and brought out through an opening made about two inches to the right of the first incision. The torn ends of the muscles were then accurately coapted by means of silk, the wound dressed and a plaster-of-paris cast applied. The patient remained in a prone position, with upper part of chest and shoulders somewhat elevated, until the cast had dried.

There was nothing particularly irregular in the history of the case during the stage of wound healing and complete repair. He had involuntary bowel movements for two days and had to be catheterized for a similar length of time.

During the second twenty-four hours had a temperature varying from 99° to 101.2° with rapid and labored respirations—thirty-two to thirty-six per minute. He felt very well, however, and took abundant nourishment. We considered the symptoms as indicating only fermentation fever, and as the kidneys were secreting an abundance of urine, we did not think any medication necessary.

On the morning of the 13th, forty hours after the operation, voluntary use of the gluteal muscles was present to a slight degree. Twelve hours later could rotate the limbs quite freely and could adduct them about eight inches each.

March 14th. No bowel movements. Could urinate voluntarily. Morning temperature, normal; evening, 101.2° . Respiration 20 to 24.

March 15th. A. M., temperature 99° , but as it was 100.6° at noon a laxative was administered; P. M., temperature 101.2° , which subsided after free catharsis to 99.4° and respiration to 24. Hamstring muscles could be used to slight degree.

March 16th. Began to have voluntary bowel movements. Motion manifest in the flexors of the toes. As there had been a little temperature for thirty-six hours (99° to 101.2°) it was deemed advisable to dress the wound. A fenestra was cut over the site of the operation. The dressings were found saturated with a reddish colored fluid. No odor of decomposition. Ends of tubes occluded with blood-clots, but no evidence of blood-clots deep in the tubes or wound. Irrigation with sterilized water and new dressings applied.

March 17th to 20th, inclusive. Temperature was 99° or less. Gradually obtained use of muscles of legs and feet and lastly of the quadriceps extensors. Some of the movements were as yet weak and uncertain in their execution, but progressive improvement was appreciable in all the muscles. The bowel movements having soiled the cast it was removed on the 20th. Wound perfectly clean and union by "primary intention." Drainage tubes removed and new cast applied. There being no rise of temperature or other unfavorable symptoms the cast was allowed to remain on four weeks.

Five and one-half weeks after accident cicatrix found to be firm. No discharge and only small bunch of exuberant granulations

over drainage holes. These were removed and surfaces healed within a week. During this week he remained in bed without a cast. About May 1st a cast was applied and he was allowed to be around in a wheel chair, and then with crutches, which he continues to carry merely as a means of safety to prevent any mishap. The last cast was removed about the middle of June.

This case presents points of great interest, and it may not be out of place, even in this report, to mention a few of the more important reasons why operative measures were, in this case, justifiable. Horsely's belief that "operation should be resorted to in all cases where displacement or crepitus indicates compression, and where extension directly after the accident clearly fails to reduce the deformity, provided there are symptoms present which indicate interference with the functions of the cord," is undoubtedly more in keeping with the step of modern surgery than the statements of Hutchinson and L. Clark, who sweepingly condemn all such operations as unjustifiable. The practice of great extension and forcible rotation is certainly far from being a safe procedure, in any case, since by the forcible movement of a fragment which may be in close proximity to, or in contact with, the dura or the cord itself, an extensive laceration of the meninges and of the cord substance might be produced.

As "the proof of the pudding is in the eating," so the proof of the justifiability of an operation is in the pathological conditions found and the success of the efforts for their removal. In this case we encountered three important pathologico-etiological conditions which we were able to remove. First, small fragments of bone, which, as before stated, might cause a fatal inflammatory process; second, extradural extravasation of blood. Hutchinson states that "he has never seen it to the extent of possible compression," but Oldknow, Stephen Smith, Jones and Willett have reported cases in which extravasation of blood was the cause of compression. In this case the spinal canal and the surrounding parts were filled with firm blood-clots, and I do not believe that reduction simply would have relieved all of the compression. Third, dislocation, etc. As a result of operating we were able to effect a complete reduction of the articular processes, as well as of the bodies of the vertebræ, and to employ efficient means for

the maintenance of the reduction, and also to make an anatomical coaptation of the divided muscles, etc., all of which, of necessity, add to the appearance, strength and usefulness of the spine.

From the conditions noted, I believe that operative procedure was justifiable; as for the result, I present the patient.

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